JHM236

PM-501M

ULTRA WIDE BAND PROGRAMMABLE DRIVER

User's Note

tau-tron

JHA236

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MODEL PM-501M

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The PM-501M is very simple to use, but the following high frequency rules should be followed for optimum performance.

All high frequency connections should be kept short; (1/8 watt resistors and chip caps are recommended as external components). The Fig. 1 test diagram of the PM-501M shows typical connection example.

1. INPUTS (+ IN and - IN)

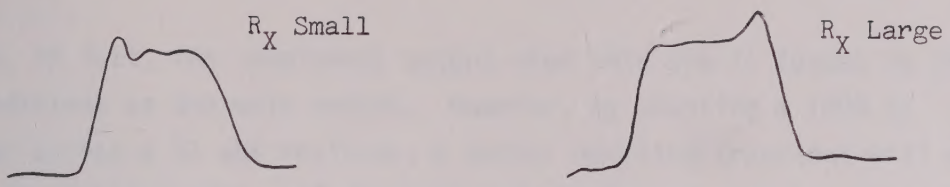
The input pins 2 and 3 are driven by 1660 type ECL gate in the differential mode, with a 50 ohm to -2 volt equivalent termination.

The front-end gate should be chosen for required bandwidth or minimum pulse width requirement as shown below:

1. 1688: "OR" INPUT, 500 MHz Motorola
2. 11C01 "OR" INPUT, 500 MHz Fairchild
3. 1660 "OR" INPUT, 300 MHz Motorola
4. 10216 "DIFF" INPUT 250 MHz Motorola

2. SUPPLY VOLTAGE (Vee and Vcc)

Pins 4 and 11 are power supply voltages and they are internally by-passed by .01 mF chip capacitors. However, additional external by-pass capacitors may improve the RF ground. The R_X resistor is connected in series to pin 11. An optional trim resistor may be added to improve the quality of the waveform as shown below. The typical value of the R_X is from 0 to 100 ohms.



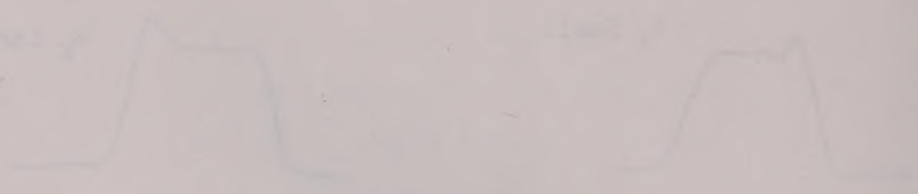
Changing the +12 volts supply could result in the same effect. The worst condition with higher R_X value (or decrease Vcc), is when the output voltage is programmed to the most positive offset value with minimum amplitude. The user can trim the R_X resistor for the required minimum amplitude and most positive offset condition.

3. AMPLITUDE AND OFFSET VOLTAGE CONTROLS (V_Z and V_{os})

Pins 10 and 6 are the output amplitude and baseline offset programming input pins. Figure 2 and Table 1 show the transfer characteristics of output program. The input current of these programming pins varies, depending on the programmed levels. Figure 3 shows an example of a high input impedance circuit with a one-to-one transfer ratio for remote control applications.

4. OUTPUT

Pin 8 is the output which must be loaded by 50 ohms. The source impedance is about 100 ohms so that the output level is a function of the load resistor.



5. EXTERNAL TRIM

Pin 7 is, in fact, the complement output when this pin is loaded by the same conditions as the main output. However, by shunting a 1000 pf capacitor across a 51 ohm resistor, a better settling transient will result at the falling edge. If the main and complement outputs are used, note that there is about 200 ps width distortion between them.

6. TESTPOINT (T.P.)

Pin 12 is factory test point and should be left open.

7. ACCURACY

Output voltage versus programmed voltage transfer characteristic and its limits are shown in Figs. 2 and 3. The test is performed using a 50 ohm $\pm$ 1% termination resistor. Note that the source impedance is 100 ohms, so that any variation of the termination resistor could reflect as an inaccuracy in the measurement.

The temperature coefficients are

pulse top --- + 1.3mV/^{o}C.
pulse bottom --- + .4mV/^{o}C.

within the ambient temperature range +10 to +40^{o} C. Non-linearity error is less than 1% full scale.

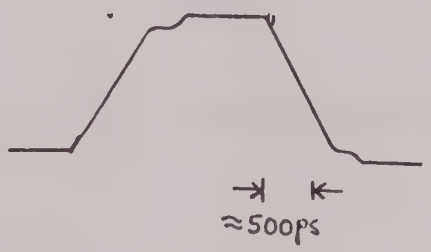
Gain Accuracy is:

pulse top --- 7.5% typical, 10% maximum
pulse bottom --- 1.5% typical, 3% maximum

The schematic diagram of Fig. 3 is designed to compensate gain and offset static errors.

8. DYNAMIC TEST

If the output waveforms are evaluated by a real time scope, the waveforms will be as shown below. It is due to the limited bandwidth of the scope amplifier, independent of repetition rate. The 400 ps transitions can be measured by a 4 GHz bandwidth scope. There is a low frequency problem associated with most sampling scopes that appears as droop. A 10:1 attenuator is recommended at the input of the scope. Refer to test diagram, Fig. 1.



9. HARDWARE

Various types of heatsinks can be chosen, depending on available space and air flow. The unit is supplied with the Wakefield #215. If the top position of the fins are bent over flat, then a lower package profile will result. Refer to the attached heatsink specification.

The Ansley #741 pin socket is suitable for the PM-501M so that the unit is easily accessible.

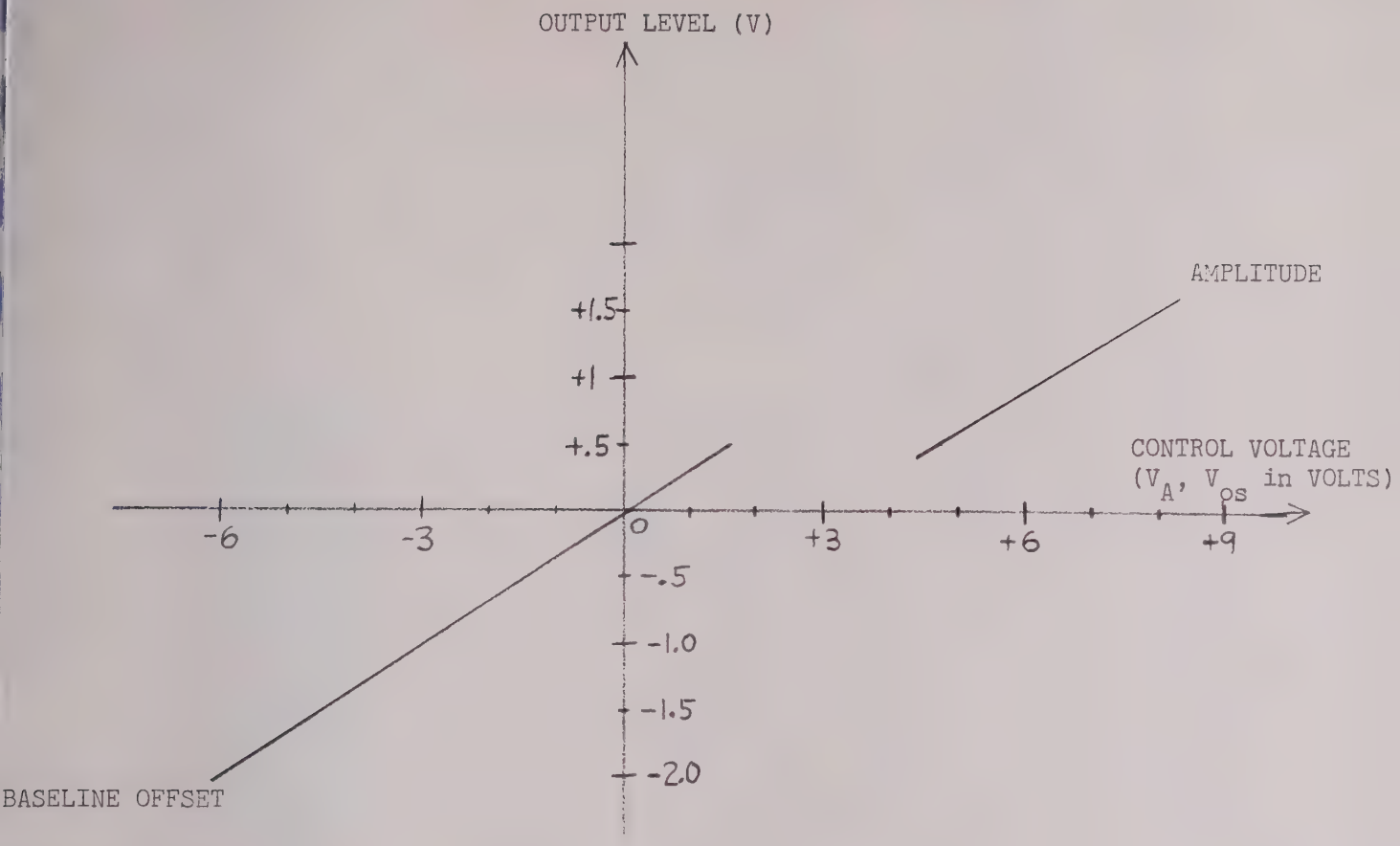
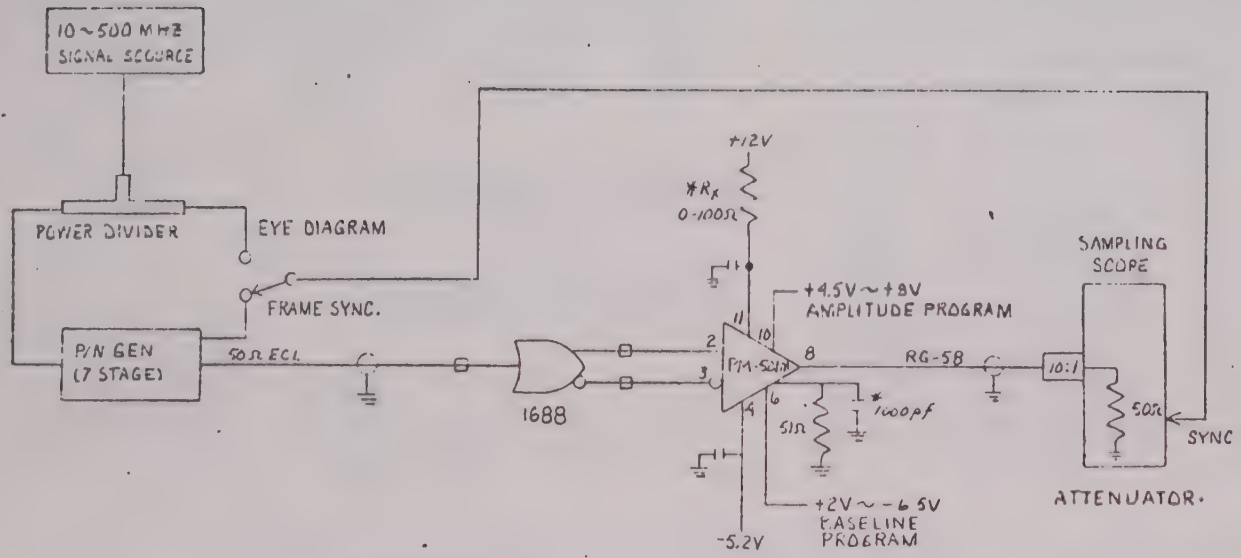


Figure 2, V_A and V_{OS} TRANSFER CHARACTERISTICS

Table 1, SELECTED POINTS OF V_A , V_{OS} vs. OUTPUT

AMPLITUDE	V_A (V)	OUTPUT V-PP	ERROR TYP.	MAX.
	+ 4.85	.5	30mV	50mV
	+ 6.35	1.0	50mV	75mV
	+ 7.90	1.5	75mV	100mV

BASELINE	V_{OS} (V)	OUTPUT (V)	ERROR TYP.	MAX.
	+1.51	+ .5	—	10mV
	0	0	—	5mV
	-3.02	-1.0	—	15mV
	-6.04	-2.0	—	30mV



NOTES:

1) UNLESS OTHERWISE NOTED:
   a) RESISTANCE VALUES ARE IN OHMS ±5%, ¼W.
   b) CAPACITANCE VALUES ARE .01µf CHIP CAPS.
2) * REFER TO OPTIONAL TRIMMING PROCEDURE.
3) ⊖ DENOTES: -5.2V 130Ω 82Ω

FIGURE 1

TOLERANCES (EXCEPT AS NOTED)	TAU-TRON, INC.		
DECIMAL ±	PM-501M	SCALE ¼	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE: TEST DIAGRAM		
ANGULAR ±	DATE 4-27-77	DRAWING NUMBER 73J-5?,20	

SERIES **200**

Featherweight Copper or Aluminum Snap-on Heat Dissipators are compatible with the entire Jedec Case Tolerance Range

WAKEFIELD ENG. INC.
WAKEFIELD, MASS. 01880
(617) 245-5900

The unique fin design permits horizontal or vertical orientation with excellent natural convection performance in either position. In forced convection applications, the axis of the semiconductor may be oriented either perpendicular or parallel to the direction of air flow.

The resilient design combined with precision manufacturing assure excellent thermal contact between cooler and case. The contact circumference is approximately 75% of the case circumference. Using no grease or joint compound, the maximum contact thermal impedance from the semiconductor case to the dissipator ID is 5°C/w for Models 201, 202, 203 and 222, 3°C/w for Models 204, 205, 207, 209 and 224, and 2°C/w for Models 211, 213 and 215. DELTA-T No. 120 Thermal Joint Compound will reduce the above impedances by a factor of 8.

Series 200 Featherweight Coolers are made from high thermal conductivity beryllium copper alloy or aluminum alloy. This assures maximum performance per unit weight. These Coolers have been included in numerous pieces of equipment subjected to MIL environmental shock and vibration tests without any recorded failures.

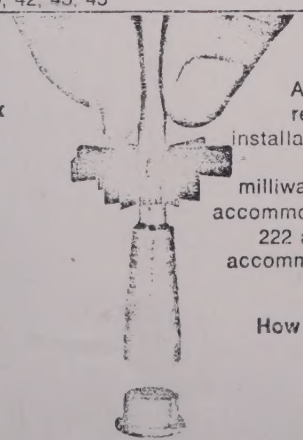
SPECIFICATIONS:

Part No.	Fig. No.	Fits Case Diameters	Fits JEDEC Case Styles	A ±.010	B ±.040	C
*201	1	.161/.240	TO-18, 24, 28, 40, 44	.150	.640	—
202	1			.150	.490	—
*203	2			.150	.640	—
*206	2			.165	.510	
*204	1	.275/.370	TO-5, 9, 11, 12, 16, 26, 29, 33, 39, 42, 43, 45	.255	.550	—
*205	1			.255	.720	—
*207	2			.255	.720	—
*208	2			.280	.580	
*209	3			.255	1.280	.720 ± .040
*211	1	.440/.544	TO-8, 38, 48	.420	.830	—
*213	2			.420	.830	—
*215	3			.420	1.400	.830 ± .040
222	4	.165/.240	2 pcs. TO-18, 24, 28	.150	.640	.375 ± .015
224	4	.275/.370	2 pcs. TO-5, 9, 11, 12, 16, 29, 33, 39, 42, 43, 45	.255	.720	.437 ± .015

*Parts available in aluminum

Standard Combinations of Materials & Finish — **Suffix**

- Beryllium Copper per MIL-C-81021 with Black Ebonol "C" finish per MIL-F-495 — CB
- Beryllium Copper per MIL-C-81021 with no finish — CP
- Aluminum alloy 6061T6 with black anodize finish — AB
- Aluminum alloy 6061T6 with no finish — AP



Model 160 and 161 Installation Tools

Although tools are not required for mounting, installation tools do facilitate rapid assembly of all milliwatt coolers. Model 160 accommodates 201 thru 209, 222 and 224. Model 161 accommodates 211, 213 and 215.

How to order:

201 — CB

↑ TYPE — ↑ MATERIAL & FINISH

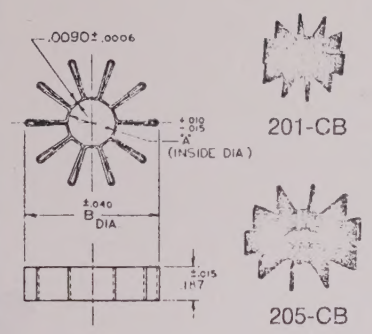


FIG. 1

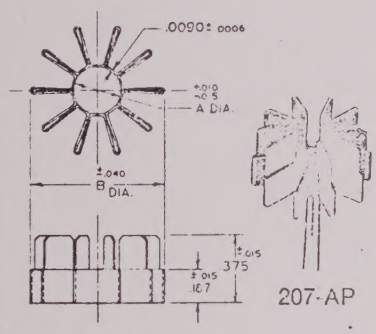


FIG. 2

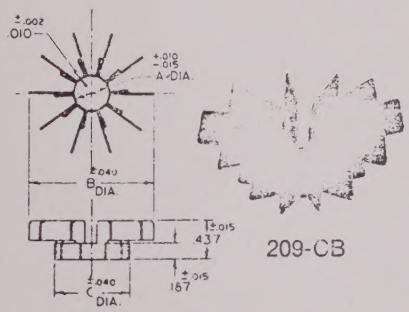


FIG. 3

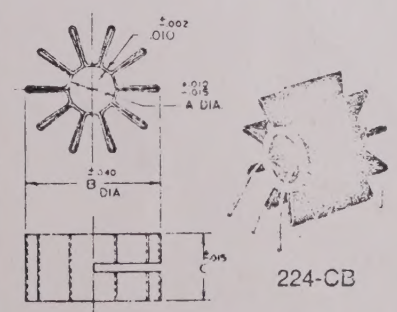


FIG. 4

Tau-Tron, Inc. 27 Industrial Ave., Chelmsford, MA 01824